POSITION CALIBRATION ROUTINE FOR INSTRON 8500 TEST STAND	
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1.0   Purpose

1.1   The purpose of this routine is to define the method for calibrating Position on Instron 8500 Test Stand.

2.0   Equipment Required

2.1   The following equipment is required to perform position calibration on the Instron 8500 Test Stand. A calibrated, N.I.S.T. traceable Digital Displacement Indicator Standard with readout. Use Starrett Electronic Indicator Model 2750-1 with .0001" resolution or equivalent.

3.0   Inspection and Setup

3.1   Visually inspect the Transducer to be calibrated and record any evidence of damage on the calibration data sheet.

3.2   Calibration will only be done when the laboratory environmental conditions are normal i.e. temperature, humidity.

3.3   Category I equipment (and category II if recalibrating an existing set-up) must have "As Found" data taken prior to making any adjustments to the calibration. "As Found" data is not required for Controllers being calibrated to a new or different transducer. "As Found" data will be collected in auto range at levels shown in Step 4.2.6. The routine for collecting "As Found" data is shown in Step 4.0.

4.0   Calibration

4.1   The calibration will consist of up to three data runs. These data runs will be documented and labeled "As Found", "Corrected" and "As Left". Each Data run will consist of ascending and descending data for tension and compression unless stated otherwise on the data sheet. In the event that the "As Found" Data meets the acceptance criteria stated in Step 6.0 only an "As Left" data run must be made. If the "As Found" data is not in tolerance, then the calibration will need to be adjusted and the "Corrected" and "As Left" data runs need to be made. Documentation requirements are covered in Step 5.0.

4.2   **HOW TO CALIBRATE AND VERIFY INSTRON 8500 POSITION READOUT**

4.2.1   Set position zero suppression to off.

4.2.2   Set position set point to zero.

4.2.3   Verify position range set to Auto.

4.2.4   Setup Displacement indicator. The Displacement Indicator must be set up such that it is parallel to the motion of the actuator.

4.2.5   Zero the Displacement Indicator.

4.2.6   Take calibration data. A calibration data run will consist of ascending and descending data for extension and retraction of the actuator unless stated otherwise on the data sheet. Data will be taken at the following points shown: **2 inch full scale-** 0.000, .025, .050, .100, .175, .250, .500, 1.000, 1.750, and 2.000 inches. **3 inch full scale-** 0.000, .025, .050, .100, .175, .250, .500, 1.000, 1.750, 2.500, and 3.000 inches.

4.2.7   At each comparison point, record the test stand position reading and the Displacement indicator reading on the calibration sheet in the **"As Found"** columns.

4.2.8   If the **"Error % Reading"** criteria listed in Step 6.0 are met, then go to Step 4.2.19.

4.2.9   If the **"Error % Reading"** criteria listed in Step 6.0 are not met, go to Step 4.2.10.

4.2.10 The calibration must be corrected. Use the MMI keypad and hydraulic toggle controls to execute the following commands:

4.2.11 To Erase NV Ram, press the following keys:
Function
Instron service
Continue
Erase NV Ram

4.2.12 To Enter Loop values, press the following keys:
Position setup
Loop
PROP 10, INT 1.0, DER .1

4.2.13 To Unlock position calibration, press the following keys:
Function
Instron Service
Continue
Calib lock-Push the calib switch twice to change to unlock

4.2.14 To Enter Position full scale value, press the following keys:
Position setup
Cal
Cal
Full scale
Enter full scale value

4.2.15 To perform coarse and fine balance, perform the following steps:
Turn actuator on
Jog so position display shows 0
Set up dial indicator for zero point
Push coarse balance key
Push go key. When cal light starts flashing slow, go to next step
Push Position setup key
Push Cal key
Push Cal key
Jog to positive full scale using dial indicator
Push span key
Enter cal point
Press go key. When cal light starts flashing slow, go to next step
Go to zero on dial indicator
Press fine balance

4.2.16 To Save Calibration data press the following keys:
Function
Instron service
Continue
More
Pos'n data
Save data

4.2.17 Repeat Steps 4.2.6 & 4.2.7 and record on the calibration sheet in the **"Corrected"** columns.

4.2.18 If the **"Error % Reading"** criteria listed in Step 6.0 are met, then go to Step 4.2.20.

4.2.19   If the **"Error % Reading"** criteria listed in Step 6.0 are not met, go to Step 4.2.10.

4.2.20   Repeat Steps 4.2.6 & 4.2.7 and record on the calibration sheet in the **"As Left"** columns.

4.2.21   Verify the "**Repeatability Error %**" criteria listed at the end of the routines are met. If the criteria are not met, go back to Step 4.2.10.

4.2.22   If all criteria listed in the routines are met, then the calibration is complete. Proceed to Step 5.0

5.0   Documentation

5.1   All Data will be documented using the Calibration Sheet. Obtain a blank copy of the Calibration Sheet from the Calibration Database Coordinator.

5.2   All information slots must be completed as shown below:

Test Stand No:	# for stand being calibrated
Mode:	Position/extending or retracting
Calibration Task No:	X
Ex Voltage:	n/a
NIST Traceable Standard ID:	ECN/MCN of Standard Used
V/FS:	10
mV Sensitivity:	n/a
Xducer/ Controller SN:	ECN, MCN, or Serial
Cal. Range:	Range Full Scale
Cal SW:	n/a
Sh Cal:	n/a
Note:R5=	n/a
Note:R8=	n/a
Cal. By:	Your Name
Cal. Date:	Date calibration was performed
Next Cal. Date:	Check frequency on EMIT

5.3   The program will automatically calculate the "Error % of Reading" for each set of data as they are entered. The program must be told which columns to use to calculate the "Repeatability Error %".

5.4   Save the completed spreadsheet

5.5   Provide electronic copy of calibration data to the Calibration Database Coordinator.

5.6   Print final results and enter in the Test Stand Calibration Log.

5.7   Place calibration sticker on equipment with due date.

6.0   Calibration Acceptance Criteria

6.1   The Error % of reading will be calculated for each set of data points for each data run. Error % of reading for zero can not be calculated therefore, zero reading must be between +/- .1% of transducer full scale. Error % of reading for data points up to 10% of full scale must be less than +/-2%. Error % of reading for data points of 10 to 100% of full scale must be less than +/-1%.

6.2   Formula for computing Error % of reading: (Standard reading –Machine reading) / standard reading x 100.

6.3   The Repeatability Error % of reading for each set of corresponding data points between the final two data runs will be computed. The acceptance criteria are the same as those listed in Step 6.1.

6.4   Formula for computing Repeatability Error % of reading: (Error % of reading run 1) – (Error % of reading run 2)